Juvenile Monitoring Satellite Project Work Team

Meeting Notes
August 5th, 2004
Yolo Bypass Wildlife Area

Participants: Phillip Gaines (FWS), Michelle Workman (EBMUD), Jim Earley (FWS), Donna Maniscalco (Jones & Stokes), Richard Corwin (USBR), Erin Chappell (DWR), Duane Massa (DFG), Colleen Harvey-Arrison (DFG), Paul Ward (DFG), Jason Kindopp (DWR), Larry Hansen (FWS), Kevin Melanephy (Fishery Foundation), Bill Poytress (FWS), Andrea Fuller (S.P. Cramer), Bill Mitchell (Jones & Stokes), J.D. Wikert (FWS), Mike Gorman (FWS).

I. **Modify/Adopt draft meeting notes from 5/27/04** - The previous meeting notes were adopted with no changes.

II. **Modify/Adopt agenda** - The agenda was adopted with no changes.

III. **Announcements -** Status of CALFED PSP: **P. Ward** announced that a CALFED PSP was likely to open September 30 with a 60-day turn around for submission of proposals. **J. Wikert** stated that the PSP was only to cover monitoring of existing CALFED funded projects. However, **P. Ward** thought there were two PSP's coming out at the same time. The first to cover monitoring and the second would cover new research. **P. Gaines** proposed a special meeting, for those interested, to identify data gaps and for possible coordination and collaboration on projects where appropriate. **L. Hanson** and others supported the idea of a meeting for coordinating projects and approaches to the PSP process. Interested parties agreed to meet on September 14 at 9:30 AM (Yolo Bypass Wildlife Area).

Discussion topic 1.

Rotary-screw trap calibration (trap efficiency trials)

General comments - **P. Ward** stated that the objectives of a study should be considered before calibrating screw traps, (e.g., if estimates of juvenile abundance are not a primary objective of the study, then trap calibration may be unnecessary). **P. Gaines** added that there are other methods for producing estimates of abundance that would be discussed later in the meeting. He also suggested that there are situations, irrespective of objectives, where it may not be appropriate to try to estimate abundance.

1. **Trap location** - Where should rotary-screw traps be physically placed in the stream to properly conduct mark-recapture trials (i.e., what should be considered when selecting a location for the trap?).

   P. Gaines suggested that most literature suggests placing the trap in the thalweg. However, his experience has been that often the thalweg is not well defined. He further

stated that he believed the recommendation for placing the trap in the thalweg was simply to try to recapture more marked fish, thereby, improving the precision of passage estimates. **D. Massa** said they place their trap just outside of the thalweg to reduce mortality of captured fish (i.e., high velocity flows in the thalweg cause increased water velocities in the live box resulting in higher mortality of captured fish). **J. Early** said that on Clear and Battle Creek they recapture sufficient numbers of marked fish no matter where they place their traps, so they place them primarily where they sample the best (efficiencies range from 10 to 25%). **C. Harvey-Arrison** said in some locations water velocities may not be high enough for the traps to operate correctly.

2. **Mark-recapture trials**- How do you determine the appropriate number of fish to mark and release?

   B. Mitchell said the number of marked fish recaptured defines the variability about the efficiency estimate. Therefore, you need to determine how many marked fish you need to recapture, given some idea of your efficiency, to determine how many marked fish to release. **M. Workman** recalled that the CAMP protocol for mark-recapture trials suggested a minimum of 20 marked fish to be recaptured for each trial. **P. Gaines** said at RBDD, they want to recapture a sufficient number so that the recapture or non-recapture of a single fish will not change the estimate of efficiency appreciably. At RBDD the USFWS releases approximately 1500 fish per trial, with an approximate efficiency of 2.0%. **A. Fuller** said they don't capture enough fish to mark and release a large group for mark-recapture trials. Therefore, they mark and release the fish they capture daily and equate efficiency by dividing the sum of recaptures over the sum released, for a given interval (3-4 days). **A. Fuller** questioned the statistical validity or appropriateness of conducting trials in this manner. **B. Mitchell and P. Gaines** concurred that Roper and Scarneccia (1994 NAJFM) found it to be an acceptable method for conducting statistically valid mark-recapture trials. **P. Gaines** also noted that he had performed trials using that particular design on Battle Cr. when large numbers of fish were not available for marking.

3. **Marking techniques** - What marking techniques are currently being used?

   J. Earley said on Clear and Battle Creek they had used several different techniques including Bismarck brown stain, photonic tags, fin clips or a combination of those. **P. Gaines** asked if **J. Earley** was concerned about fin clipping affecting swimming performance or mortality of marked fish. **J. Earley** said efficiencies have been very similar between fin clipped and Bismarck brown trials, so he was comfortable that there was not a problem. **J. Kindopp** said he has used photonic tagging but was not satisfied with the results. They now use visible implant elastomer (VIE) with good results. **P. Gaines** said at RBDD they use a dual mark of fluorescent spray-dye and Bismarck brown. **J. Wikert** expressed concern about differential predation on spray-dyed fish. **P. Gaines** explained that the pigment was only visible under ultra-violet light. Therefore, you would not expect differential predation.

4. **Release strategies** – Where, how and when should marked fish be released?

J. Kindopp stated fish should be released such that you meet the assumption of random distribution of marked and unmarked fish and marked fish need adequate time to mix. Jason also said they used to spread the release across the stream transect but have discontinued this practice because it didn't seem to affect trap efficiency. **B. Mitchell** said they release marked fish approximately 1000 yards above the trap and that fish pass through a couple of riffles before reaching the sampling location. He felt that was an adequate distance for marked fish to randomly distribute with unmarked fish. He also stated that fish should be released such that predation on the marked fish is reduced as much as possible and you wouldn't want to release them to far upstream. **J. Earley** said they release marked fish approximately one-quarter mile above their traps and this provides consistent results. They also spread the release group across the stream. **P. Gaines** said at RBDD, they release marked fish four kilometers above their sampling location and also spread the release group across the river, as well as release them in very small groups to try and prevent schooling behavior as they move downstream. He further added that there is a fairly narrow constriction in the river just below the release location.

P. Gaines stated that uniform distribution of fish can allow for mixing or not. **B. Mitchell** agreed and noted that they do not want to add new variables to the process. **A. Fuller** said they slowly meter marked fish, as opposed to batch releasing.

P. Gaines noted at RBDD, they typically release fish in the evening as this is when fish are passing. **A. Fuller** questioned mark-recapture experiments during storms/high turbidity and noted that trials are usually not feasible and they have to many fish to handle. **P. Gaines** noted that fish appear to move during high flows to some threshold at which point passage slows even if high flows do not subside. To address those conditions, the RBDD traps are modified to sample one half their normal volume of water to reduce fish capture and to some extent debris loading.

5. **Assumptions of mark-recapture studies -** Do they apply, should we ignore them because fish are not part of a typical mark-recapture study due to open system/population?

P. Gaines noted the following assumptions considered at RBDD:

1. random mixing of marked and unmarked fish.
2. the population is closed during the trial period.
3. no behavioral difference between marked and unmarked (Petersen method).
4. fish exhibit equal catchability, all fish pass during recovery period.
5. no recaptured marked fish are overlooked.
6. no mortality of marked fish.

P. Gaines stated the key is random distribution between marked and unmarked fish. He then asked the group if one can check this with a single trap? **B. Mitchell** responded that you can't test because there is no control group.

Lunch Break 12:00-12:50

Discussion topics continued,

6. **Abundance Estimates –** What intervals are being used and what about missed samples?

   General comments - **P. Gaines**: The estimate interval chosen has direct effects on precision, accuracy of estimates. The greater the interval the greater precision, but the quantity of information may be diminished. Additionally the interval chosen affects confidence intervals - the wider the interval the narrower the confidence interval.

   J. Earley calculates abundance using a weekly interval. They conduct mark-recapture trials and apply the efficiency value to the period being evaluated. To account for missed samples and varying efficiencies they use a 3-day rolling average and look at the gathered samples to try and glean information of missed samples. **P. Gaines** calculates using a daily interval and reports values on a weekly or monthly interval. To account for missed samples the mean of the samples before and after the missed sample are calculated and imputed (e.g. two samples missed, take the average of the two samples gathered before and after). He states that this may be less accurate but is repeatable, although may not be defensible in a tributary environment. **B. Mitchell** stated that he used a daily interval although they have variable efficiency values even with stable flows and use an annual mean efficiency to estimate abundance. He further stated that although statistically correct, the information cannot describe temporal distribution very accurately. **M. Workman** stated that they looked at flow and fish size changes to determine efficiency intervals for estimating abundance.

7. **Alternative methods for producing abundance estimates (CPUV, temporal frequency distribution)** -What alternate methods could be used to produce abundance estimates?

   P. Gaines remarked that he had tried using CPUV at the Clear Creek rotary-trapping site assuming uniform distribution of fish. The results were very similar estimates of abundance compared to the traditional method. It was thought that this was likely due to the relatively high efficiency value (~25%) associated with the rotary-trapping gear at that site. The same method was attempted on Battle Creek, but did not produce a similar estimate in the low efficiency setting.

   P.Gaines also stated that by using multiple year data sets one can look at the proportion of a population that passes on a particular week or month to develop a temporal frequency distribution. He noted there are some variability concerns, but it is feasible with large data sets. **B. Mitchell** added that this could work when efficiency trials are not feasible. **P. Gaines** commented that available resources affect methods and that with less resources people need to look to alternate methods or "outside the box" to meet study objectives. **L. Hansen** remarked that there is better precision with more data and that one can look at trends and attempt to capture the variability in data sets.

8. **Standardization techniques -** What techniques can be employed to standardize rotary-trapping data between years or between watersheds?

General Comments **- P. Gaines** stated that each site has different nuances whereby it may be incomparable with another site. Differing resources including availability of fish make it very difficult to standardize.

J. Kindopp remarked that you need to sample all days possible and run trap efficiency trials. **A. Fuller** commented that you need a standardized protocol to follow at each site. She added that this makes annual information comparable at the sample site.

P. Gaines mentioned the Comprehensive Assessment and Monitoring Program's (CAMP) protocol was an attempt to standardize information between watersheds. Additionally, the protocol took an "umbrella" approach to cover virtually all situations that would be encountered in the various watersheds in an attempt to make information comparable. Furthermore, he added that at RBDD they still use CAMP protocols as a minimum to maintain consistency. **B. Mitchell** remarked that the CAMP protocol lacked gear effort information.